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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,976	11/20/2006	John W. Frost	6550-000086/US/NPB	4573

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EXAMINER	
SAIDHA, TEKCHAND	

ART UNIT	PAPER NUMBER
1652	

MAIL DATE	DELIVERY MODE
01/12/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/572,976	FROST, JOHN W.	
	Examiner	Art Unit	
	Tekchand Saidha	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 October 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) *1-22,31-37 and 39-45* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-30 and 38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 March 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/22/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. ***Election***

Applicant's election of Group V (claims 23-30) & the sequence of SEQ ID NO: 4 with traverse, in response filed 10/21/2008 is acknowledged.

2. The traversal is on the grounds of PCT Rule 13.1. In the least, the claims corresponding to Group V (claims 23-30) and Group VI (claim 38) should be examined together because of the common special technical feature present in these claims.

3. Applicants arguments are considered and found to be persuasive. Accordingly, restriction requirement between groups V & VI is withdrawn.

4. Claims 23-30 & 38 will be considered in this examination.

5. **Claims withdrawn**:

Claims 1-22, 31-37 & 39-45 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

6. ***Continuation of prior application***

This application filed under 35 USC 119(e) lacks the necessary reference to the prior application. This application claims the benefit of US Provisional Application No. 06/... , filed ..., should be entered following the title of the invention or as the first sentence of the specification. Also, the present status of all parent applications should be included.

7. ***Drawings***

Drawings filed 3/22/2006 are acknowledged.

8. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

9. Claim 30 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 30 depends on claim

19, a non-elected claim. Placing the claim in proper dependent form will overcome this objection.

10. ***Claim Rejections - 35 USC § 112*** (first paragraph)

Written Description

Claims 23-30 & 38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants are directed toward the USPTO Written Description Training Materials made available to the public on 04/11/2008 for information regarding examination of patent claims for compliance with the written description requirement of 35 U.S.C. 112, first paragraph.

According to MPEP 2163, to satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. See, e.g., *Moba, B.V. v.Diamond Automation, Inc.*, 325 F.3d 1306, 1319, 66 USPQ2d 1429, 1438 (Fed.Cir. 2003); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d at 1563, 19 USPQ2d at 1116.

The method steps reciting the products must comply with the written description requirement. The claims are genus claims directed toward a method using a genus of 2-keto 3-deoxy 6-phosphogalactonate aldolase (KDPGal aldolase) from any source or any amino acid sequence and structure or a method using a genus of any "DHQ synthase" from any source.

The scope of each genus includes many members such as KDPGal aldolase or synthase enzymes with widely differing structural, chemical, and physical characteristics. Furthermore, each genus is highly variable because a significant number of structural differences between genus members exits. Recitation of the name "KDPGal aldolase" and/or its source as a "Klebsiella pneumoniae", for example, do not define any structural features and amino acid sequences commonly possessed by the

genus. The specification does not describe and define any structural features and amino acid sequences commonly possessed by each genus. There is no art-recognized correlation between the structures of the KDPGal aldolase from "Klebsiella pneumoniae" with the other KDPGal aldolases. Those of ordinary skill in the art would not be able to identify without further testing other specific KDPGal aldolases that can be used in the claimed method.

The instant specification discloses KDPGal aldolases of the sequences of SEQ ID Nos. 2, 4 & 6. The instant specification is not so clear about the sources of DHQ synthases. The meager exemplifications of these KDPGal aldolases is not representative of the genus of KDPGal aldolases or synthases being used in the method.

MPEP § 2163 states that a representative number of species means that the species which are adequately described are representative of the entire genus. Thus, when there is substantial variation within the genus, one must describe a sufficient variety of species to reflect the variation within the genus. In this case, the specification fails to disclose additional KDPGal aldolases or synthases, encompassed by the claims. As such the disclosure of the above mentioned *species is* insufficient to be representative of the attributes and features common to all the members of each claimed genus. Thus, one skilled in the art cannot visualize or recognize the identity of the members of each claimed genus.

In view of the above considerations, one of skill in the art would not recognize that applicants were in possession of the invention recited in claims 23-30 & 38.

11. ***Enablement Rejection***

Claims 23-30 & 38 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method for converting pyruvate and E4P to DAHP, comprising contacting an isolated or recombinant KDPGal aldolase of sequence of SEQ ID NO: 4 with a solution containing pyruvate and E4P, does not reasonably provide enablement for a method for converting pyruvate and E4P to DAHP, comprising contacting any isolated or recombinant KDPGal aldolase from any source with a solution containing pyruvate and E4P (claim 23). Claims 24-30 & 38, have added

limitation wherein the method comprise DHQ synthase from any source (claim 24); DHQ hydratase (claim 25); wherein the method is performed within a recombinant cell (claim 26); wherein said host cell is produced by transforming the cell with nucleic acid encoding at least one of a KDPGal aldolase or a DHQ synthase; wherein said recombinant cell contains at least one recombinant transketolase or at least one recombinant transaldolase (claim 28); Use of a recombinant KDPGal aldolase to produce DAHP from pyruvate and E4P (claim 29); use according to Claim 19, wherein said use further includes use of a recombinant DHQ synthase to produce DHQ from said DAHP (claim 30); and the process of preparing DAHP and intermediate compounds of the shikimate pathway, viz., DHQ and DHS.

The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

The scope of the claims does not commensurate with the enablement provided by the disclosure with regard to the extremely large number of enzymes, including variants, broadly encompassed by the method claims. Since the amino acid sequence of a protein determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires a knowledge of and guidance with regard to which amino acids in the protein's sequence, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the proteins' structure relates to its function. However, in this case the disclosure is limited to the amino acid sequence of SEQ ID Nos. 2, 4 and 6. Regarding, the derivative(s) resulting from the catalysis of the enzymatic reaction of the method (claim 38), the specification provide no guidance to one skill in the art to make derivatives by the process disclosed. The various compounds formed are mere intermediates of the pathway.

While recombinant and mutagenesis techniques are known, it is not routine in the art to screen for multiple substitutions or multiple modifications, as encompassed by the instant claims, and the positions within a protein's sequence where amino acid

modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims. The scope of the claims must bear a reasonable correlation with the scope of enablement (In re Fisher, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of exact nature of the encoding DNA (or polynucleotide) to prepare the recombinant host cells and the encoding of specific pathway enzymes of known substrate specificity having the desired enzymatic characteristics in order that be used in the method is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

12. ***Claim Rejections - 35 USC § 112*** (second paragraph)

(a) Claims 29-30 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 29-30 provides for the use of KDPGal aldolase, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 29-30 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd. App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

(b) Claims 23-30 & 38 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 23-30 & 38 recite uncommon abbreviations. The first of uncommon abbreviation(s) must be spelled out which may be abbreviated subsequently.

13. Henderson et al. [J. org. Chem. (1998), vol. 63, pages 906-907)] teach isolation of 2-Keto-3-deoxy-6-phosphogalactonate aldolase [(KDPGal aldolase) (EC 4.1.2.21)] from Pseudomonas cepacia eda- strains *lacking* a 2-keto-3-deoxy-6-phosphogluconate aldolase, resulting in 10-fold improved purification over previously reported sources. The enzyme showed a classical bell-shaped pH-activity curve with a pH maximum near 7.5 and >50% of maximum activity available over the pH range 6.5-9.5. The reference though uses various substrates, does not teach using pyruvate and erythrose 4-phosphate (E4P) for the formation of 3-deoxt-D-arabino-heptulosonate 7-phosphate (DAHP). The reference has been made of record but has not been used in any art rejection.

14. No claim is allowed.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tekchand Saidha whose telephone number is (571) 272 0940. The examiner can normally be reached between 8.30 am - 5.00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nashaat T. Nashed can be reached on (571) 272 0934. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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